Relaxant and antioxidant capacity of red wine polyphenols on isolated mice corpora cavernosa

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Introduction. The wine polyphenols resveratrol and quercetin are known for their vasorelaxant and antioxidant capacity. It is assumed that they exert their effect through activation of the NO/sGC pathway. Vasodilators as well as antioxidants can regulate penile erection and be beneficial for the treatment of erectile dysfunction (ED).

Aims. The goal of this study was to evaluate the NO/sGC dependency of the relaxant effect of resveratrol and quercetin on mice corpora cavernosa (CC) as well as to explore their influence on oxidative stress-induced ED.

Methods. Isolated mice CC were mounted into organ baths. Cumulative concentration-response curves were constructed for resveratrol and quercetin in the absence/presence of inhibitors of the NO/sGC pathway. In addition, the effect of resveratrol and quercetin was studied on NO-mediated corporal relaxations using acetylcholine (Ach), sodium nitroprusside (SNP) and electrical field stimulation (EFS). In certain experiments corporal tissues were exposed to oxidative stress using palmitic acid (PA, 0.5 mM).

Results. While both polyphenols are potent vasodilators of mice aorta, only resveratrol relaxes mice CC. In contrast to aorta, the relaxant capacity of resveratrol on CC was not diminished in $sGC\alpha_1^{-/-}$ mice. The polyphenols did not influence Ach-, SNP- or EFS-mediated relaxations as such. Only resveratrol was able to significantly reverse PA-induced decrease of EFS relaxations.

Conclusion. The red wine compound resveratrol, but not quercetin, relaxes isolated mice CC concentration-dependently manner through mechanisms independent of the NO/sGC pathway. In case of mild oxidative stress, resveratrol acts as a protective antioxidative compound and preserves relaxation in mice CC.